

“One Of A Kind”



SB-UL6090-15PS

**UL Listed
Indoor/Outdoor
Power Supply Equipment**

**Rainproof Type 3R
Enclosure***



**COMMUNICATIONS
SERVICE
EQUIPMENT**
E464957

The **SB-UL6090-15PS** is a UL Listed 60/90 volt 15/10 Amp power supply and is the first of its kind. The UL Listed housing is a Type 3R rainproof enclosure with excellent ventilation features designed into the housing. The **SB-UL6090-15PS** comes with "Double Protection". It includes an internal circuit breaker, as well as an automatic shut down sensor. The **SB-UL6090-15PS** will operate continuously at 100% maximum load. The unit is designed to mount on a wall, pole, or pedestal. The unit is 60 VAC or 90 VAC, field selectable and comes with a three year limited warranty.



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A Division of PDi Communications Inc.

SB-UL6090-15PS

Broadband Network Power Supply

Technical Manual

MODEL: SB-UL6090-15PS

Warranty Information Enclosed



ALL UNITS SHIPPED IN 60V MODE – FIELD SELECTABLE 60V/90V

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MAJOR FEATURES OF THE SB-UL6090-15PS

1. The unit is a UL Listed 60/90 volt 15/10 amp power supply and the first of its kind.
2. The UL Listed housing is a Type 3R rainproof enclosure with excellent ventilation features designed into the housing.
3. The SB-UL6090-15PS comes with "Double Protection". It includes an internal circuit breaker, as well as an automatic shut down sensor.

In the event of a short circuit, overheating, or faulty wiring - the unit will automatically shut down.

Once the problem has been resolved, just reset the automatic sensor and the unit will turn back on.

4. The SB-UL6090-15PS will operate continuously at 100% maximum load.
5. The unit is designed to mount on a wall, pole, or pedestal.
See EZ MOUNT option on page 9.
6. All units are 60 VAC or 90 VAC, field selectable.
Shipped in 60 VAC mode (factory configuration).
7. **Each component in the SB-UL6090-15PS power supply is individually UL Listed.**
8. **Being UL Listed removes most code restrictions.**
9. Three year limited warranty (see page 15).

IMPORTANT SAFETY INSTRUCTIONS

1. Read these instructions carefully before proceeding with any part of this unit's installation.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. "Only qualified, professional personal should perform the procedures described in this document.
6. It is required that the user contacts local utilities, local building maintenance departments, and cable/piping locator services to ensure that installation does not interfere with existing utility or building cables & piping.
7. The unit must be installed vertically in a well-ventilated area and away from flammable, explosive and corrosive material.
8. Don't block any ventilation openings. Install in accordance with the manufactures instructions.
9. Don't install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
10. DO NOT connect the AC inlet while installing the unit or servicing the unit.
11. Always wear insulating gloves and face shield whenever working with the unit.
12. The unit must be well earthed before proceeding with installation and operation. The integrity of the protective earth must be ensured at all times.
13. Branch Circuit protection is required: An External Service Disconnect is required for this equipment. (*Details on pg. 10*)
14. Wiring of the unit and connection of output ports must be firm and reliable. Poor connections may cause fire.
15. Verify that AC input voltage to the equipment matches with respect to voltage and frequency prior to installation.
16. Verify that output voltage from the equipment matches the voltage requirements of the connected equipment (load).
17. Always remove power before working inside the unit.
18. Always refer to the manufactures recommendation whenever replacing parts on the unit.
19. Unauthorized alteration or repair is not allowed without manufactures written authorization.
20. Only use attachments/accessories specified by the manufacturer.
21. Always use proper lifting techniques whenever handling the unit.
22. Always lock the enclosure when unattended.

IMPORTANT NOTES

NOTE

Photographs contained in this manual are for illustrative purposes only. These photographs may not match your installation exactly. Our products are subject to change through continuing improvement processes without prior notice.

NOTE

Operator is cautioned to review and be fully aware of the drawings and illustrations contained in this manual before proceeding. If there are questions regarding safe operation of the unit, please contact PDI directly.

NOTE

PDI Communications Inc. shall not be held liable for any damage or injury involving its enclosures, power supplies, generators, batteries, or other hardware if used or operated in any manner or subject to any condition not consistent with its intended purpose, or is installed or operated in an unapproved manner, or improperly maintained.

NOTE

The following symbols have been placed throughout this manual. Where these symbols appear, use extra care and attention.



WARNING!

Presents safety information to **PREVENT INJURY OR DEATH** to the technician or user.



CAUTION!

Indicates safety information intended to **PREVENT DAMAGE** to material or equipment.

OVERVIEW

1.1 Unpacking and Pre-installation Inspection

1.1.1 Unpacking

Remove the Power Supply from the shipping container and verify if all parts you ordered have been included. Standard package should contain the following:

- ✓ One (1) piece SB-UL6090-15PS Non-standby Power Supply.
- ✓ One (1) copy of this User Manual and a 3-year limited warranty enclosed.
- ✓ Installation Hardware.

Carefully inspect the contents of the shipping container. If any items are damaged or missing, contact PDI immediately.

1.1.2 Pre-installation Inspection

- During shipping, movement of components may occur. Inspect the power supply for possible shipping-related failures, such as loosened or damaged connectors. If needed, inspect the interior for loose or damaged connectors. Correct any discrepancies before proceeding with the power supply installation.
- Do not attempt to install a damaged power supply without first passing a complete Pre-installation Inspection.



CAUTION!

Use the original shipping container if the unit needs to be returned for service. If the original container is not available, make sure the unit is packed with at least three inches of shock-absorbing material in all orientations to prevent shipping damage. PDI is not responsible for damage caused by improper packaging on returned units.

1.2 Brief Introduction

SB-UL6090-15PS non-standby UL Listed power supply providing conditioned power to signal amplifiers in cable television and broadband distribution systems. The UL Listed transformer is mounted inside a UL listed Rainproof type 3R enclosure (*for Indoor or outdoor use*) and supplies the load with current limited, fully regulated AC power that is free from disturbances caused by spikes, surges and other forms of power line transients. AC power entering the transformer is converted into a quasi-square wave and regulated at the required output voltage.

The power supply output is either 60Vac or 90Vac field selectable, "Not to be used simultaneously." Shipped in 60VAC mode.

1.3 Theory of Operation

The SB-UL6090-15PS contains a Ferro resonant transformer, resonant capacitor, input breaker, terminal blocks and various electrical parts. **All components are individually UL Listed.**

The transformer is a Ferro resonant design, which features constant and fully regulated output voltage, stable performance and high reliability. Primary and secondary windings of the transformer are physically isolated from each other by a steel core, which reduces the capacitive coupling of spikes and noise to the secondary winding.

A resonant capacitor is connected to the secondary winding of the transformer forming a tank circuit. The advantage of this type of transformer/capacitor design is the ability of the transformer to regulate its output voltage over a wide range of input voltages and output loading. It is advantageous in Broadband TV Network applications as active devices are protected from dangerous voltage fluctuations.

1.4 Outline Diagram

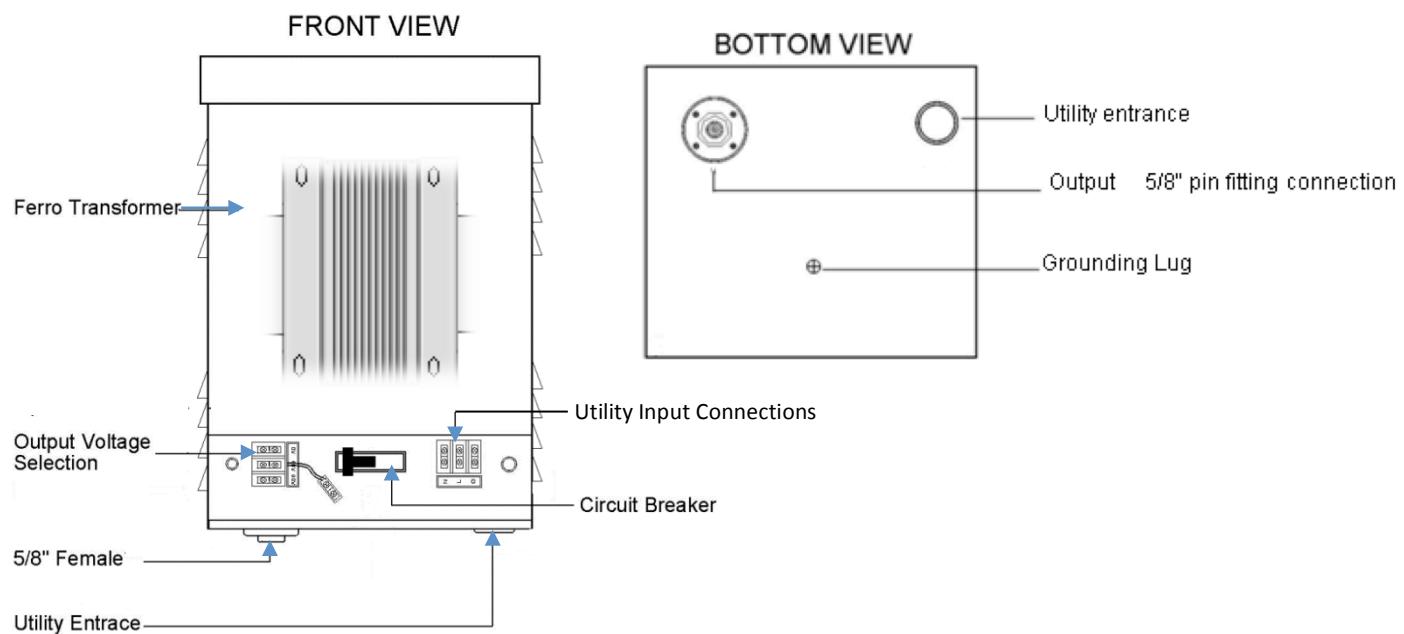


Figure 1.1, Outline Diagram

1.5 Technical Specifications

Table 5.1, Technical specifications

| Model | Input voltage (VAC) | Input frequency (Hz) | Output voltage (VAC) | Output current (A) | Output current (A) MAX. | Output power (VA, max.) |
|----------------|---------------------|----------------------|----------------------|--------------------|-------------------------|-------------------------|
| SB-UL6090-15PS | 120 | 60 | 60/90V | 15/10 | 15/10 * | 900 |

| Input | |
|-----------------------|---|
| Voltage range | +/- 10% |
| Power factor | >0.90 at full load |
| Protection | Circuit breaker 1P, 16A Supp. (Thermo-magnetic release) |
| Output | |
| Current/Load | 100% of Rated Maximum (A) |
| Voltage Regulation | $\pm 5\%$ |
| Waveform | Quasi-square wave |
| Efficiency | $\geq 90\%$ |
| Protection | Current limited/ Self Hold Resettable Thermal Fuse |
| Short circuit current | 150% of maximum current rating |
| Mechanical | |
| Enclosure | Rainproof Type 3R |
| Dimensions | (H) 13.5" (W) 8.5" (D) 9.0" |
| Finish | Powder coat |
| Material | Aluminum |
| Environmental | |
| Operating temperature | -40°C to +40°C @ Max Load |
| Humidity | -40°C to +55°C @ < Max Load |
| | 0-90% non-condensing |

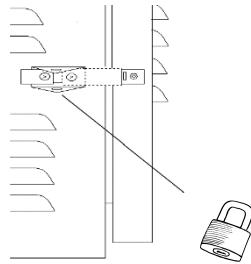
* Do not exceed maximum output current levels.

PAD LOCK



WARNING!

- The enclosure is equipped with a Pad Lockable Draw Latch.
- The enclosure MUST always be locked when un-attended.
("pad lock not supplied")



2. INSTALLATION *This power supply is designed to be mounted on a pole or wall.*

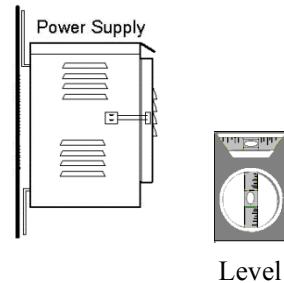
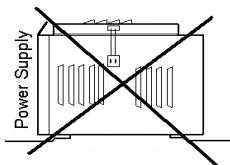


DO NOT operate this equipment unless it is up-right, vertical and horizontally Level, and installed in accordance with these instructions.



2.1 Installation Notes:

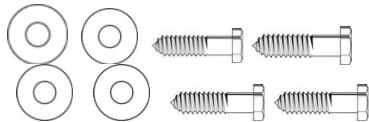
- Only qualified professional personnel should perform installation of this unit.
- In some districts, local codes may require that the base of the enclosure be at a minimum height from the ground. Always verify height restrictions before proceeding.
- Installation of the unit must be firm and reliable. Failure to do so may result in injury.
- Wear protective equipment when installing the unit.
- Be careful of sharp edges and corners on the enclosure.
- Use proper lifting techniques.



Level

2.2 Wall Installation

The SB-UL6090-15PS standard installation hardware includes: 4 Hex head lag screws 5/16" x 2 1/2" and 4 washers. **(Optional E-Z Mount Brackets are available upon request. PN SB-UL6090-EZ)**



This Unit must be mounted on a strong, solid, reliable surface. When mounting to concrete or any masonry, it is required to use masonry wall anchors or concrete screws. *(Not supplied)*



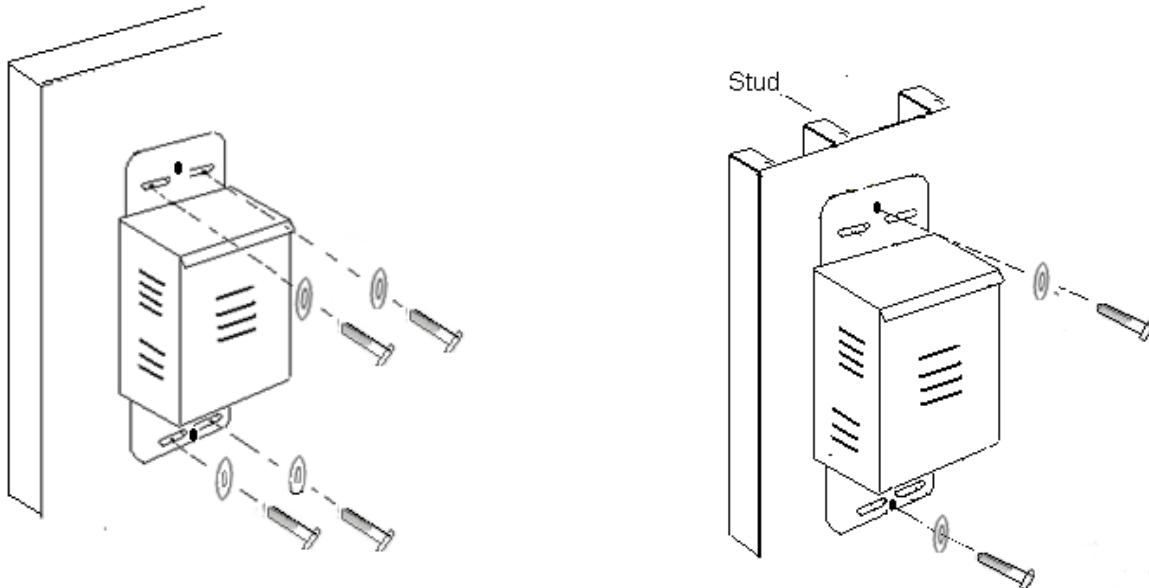
- 1.) Mark Positions for mounting.
- 2.) Drill a 15/64" pilot hole for soft to medium wood or a 1/4" pilot hole for hard wood.
follow mounting examples.

(continued)

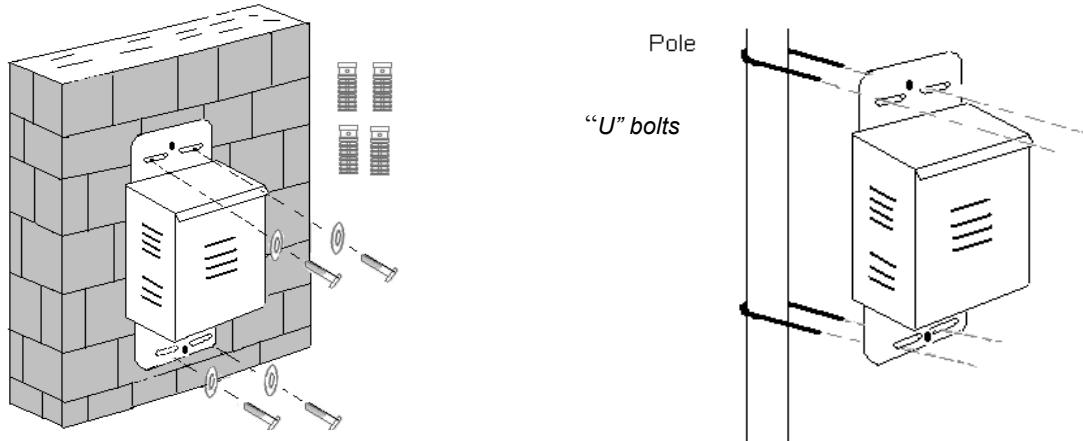
MOUNTING EXAMPLES

figure 2.3

Solid



Masonry

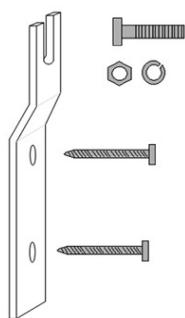


2.3 Pole Mount Installations

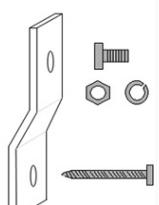
The power supply can be mounted on poles up to 4 1/2" in diameter using a "U" Bolt system. For larger diameter poles, we have several options available. Please contact your sales rep so we can select the correct pole mounting hardware to fit your specific application.

NOTE: Utility poles are typically the property of the local Utility. The Utility must approve both the location and the method used to mount on these poles before installation.

Top Hardware



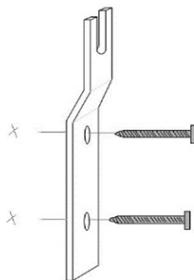
Bottom Hardware



EZ MOUNT

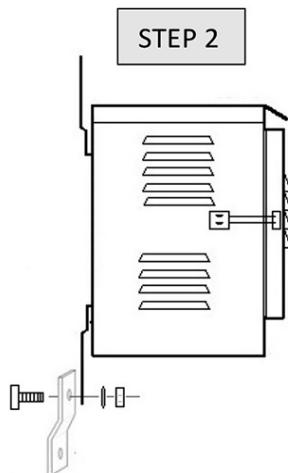
Installation Instructions

STEP 1



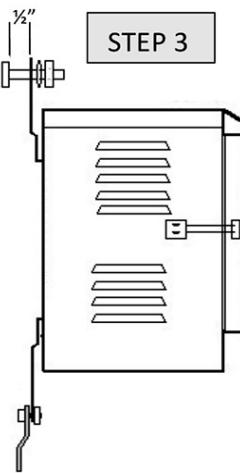
On a strong reliable surface:
Mark positions for mounting. Drill pilot holes and secure the top bracket with lag bolts. When mounting to concrete or any masonry, it is required to use masonry wall anchors or concrete screws.
(Not supplied)

STEP 2



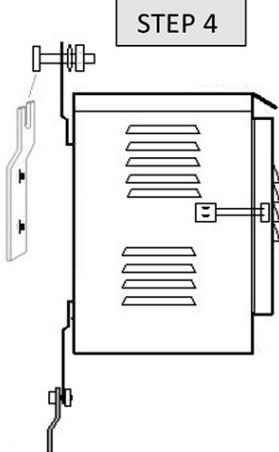
Attach the bottom hardware to the enclosure as shown. Use the center hole in the back plate. Tighten completely!

STEP 3



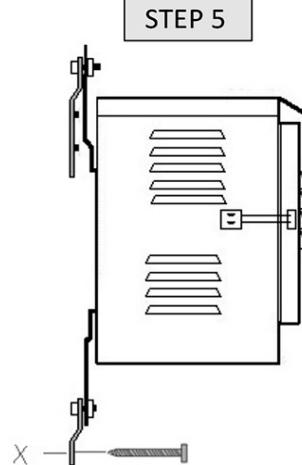
Attach the top machine bolt washer & nut as shown. Hand tighten until the head of the bolt is sticking out the back approx. $\frac{1}{2}$ "

STEP 4



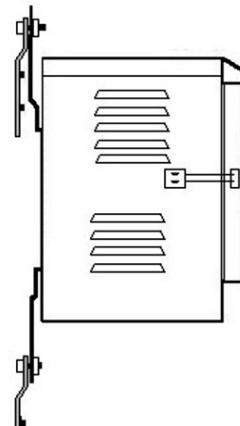
Carefully lift the unit and slide the head of the bolt into the slot of the already secured bracket. Tighten completely!

STEP 5



Level the unit! Then secure bottom bracket with the lag bolt.

Installation Complete



2.5 Utility Power (Input) Connection



CAUTION!

Branch Circuit Protection & SPD

“Installation per the American National Electric Code (NEC), article 280 or Canadian Electric Code (CEC) guidelines as applicable. The branch circuit overcurrent protection shall be a fuse or circuit breaker rated 125 VAC, 20amps maximum. The conducting voltage of the SPD (Surge protection Device), must be less than 2,500Vpk or the equivalent. Branch circuit protection is installed between the Utility power source and the power supply.”



WARNING!

Grounding

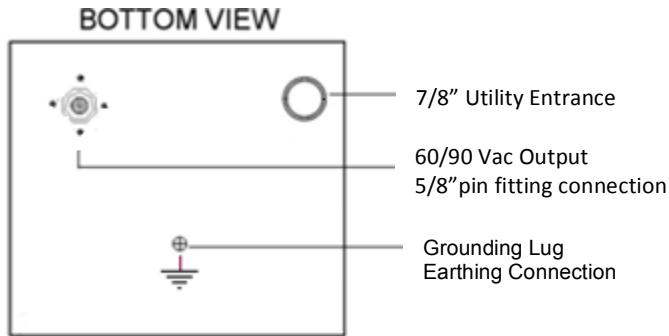
Before proceeding, this equipment must be connected directly to earth ground. **“The bonding conductor used must be a #6awg copper or equivalent.”** Connect the conductor to the external earthing connection (*grounding Lug*), *located on the bottom of the power supply*. Connect the opposite end to a reliable earth ground. Failure to do so can cause electrical shock. Consideration of a dedicated Grounding Rod is highly recommended. The integrity of the protective earth must be ensured at all times. *(follow all applicable local, and/or state electrical codes) see fig.2.5*

UTILITY ENTRANCE

The 7/8” Utility Entrance opening, *on the bottom of the enclosure*, (see fig. 2.5), accepts a standard 1/2” conduit hub, *(not supplied)*. It is required to use a NEMA 3R rated hub: *Example: (RED DOT B9001) or equivalent*.

With the branch circuit protection device **NOT connected** at this time, Install the hub, the conduit, and run the utility wires thru. Connect the wires to the Input terminal block as per specifications. *(See table 9.1 pg.11)*

fig.2.5



- Utility power presents dangerous voltage. Wear insulating gloves and use insulating tools.
- DO NOT work alone.
- Make sure voltage and frequency of the utility power fed into the unit is in accordance with nominal input voltage and frequency of the unit.

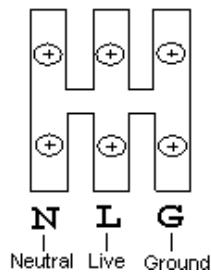
Terminal Blocks

Table 9.1, terminal blocks

| Input / Output / Terminal Specifications | | | |
|--|----------|-------------------|--------------|
| Wire Gauge | Type | Tightening Torque | Rating |
| 8 - 14 awg. cu | sol/str. | 7 in- lbs. | 600V 40A Max |

Utility Power - Connection to Input Terminal Block:

The SB-UL6090-15PS Power Supply utilizes a 3 position terminal block for **utility power** connection. Positions marked “**N**” Neutral, “**L**” Live and “**G**” Ground.



2.6 AC Output Connections / Selection Tap Specifications

Output connection for the SB-UL6090-15PS power supply is made via a 5/8" threaded female opening on the bottom of the enclosure, (for a *hardline pin fitting connector*), and the tap that connects to the terminal block for output voltage selection.

| Selection Tap Specifications | | | |
|------------------------------|----------|-------------------|----------|
| Wire Gauge | Type | Tightening Torque | Rating |
| 8-14 awg cu | sol/str. | 7 in- lbs. | 600V 40A |

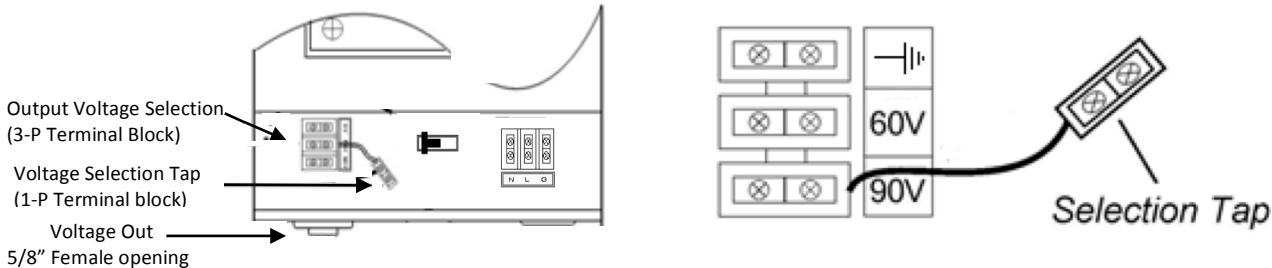


Figure 2.6,
Output Connection

2.6.1 Output connection



WARNING!

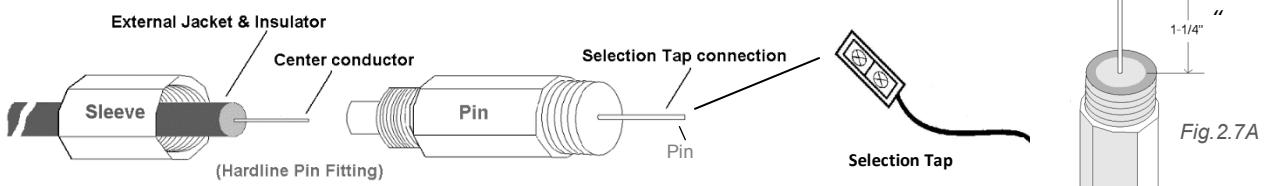
- Make sure AC input power is removed before making output connections.
- Wear insulating gloves and use insulating tools.



CAUTION! Use minimum, $\frac{1}{2}$ " (.500) Hard-line coaxial cable and appropriate pin fitting.

- 1) Prepare the coaxial cable used for distribution of power and the external Hard-Line Pin fitting (*not supplied*).
- 2) Using the appropriate stripping/coring tool, remove external material, (jacket, insulator and so on). "Follow the fittings recommended stripping lengths."

Fig. 2.7



- 3) Cut the pin on the fitting to be 1-1/4" from the tip to the thread base. (fig.2.7A)
- 4) Screw the "Pin Section" of the fitting into the 5/8" threaded female output connection, *on the bottom of the enclosure*: (see fig 2.5 pg.10).
- 5) Attach the sleeve to the cable and then insert them into the pin section of the fitting.
- 6) Screw the "sleeve section" onto the "pin section" and tighten the connection between the two.
- 7) Connect the selection tap to the Pin (shown in fig 2.6 & 2.7).
- 8) Tighten seizure screw of the tap to specified torque.

2.6.2 Output Voltage Configuration

Output voltage of SB-UL6090-15PS power supply can be reconfigured from 60V to 90V or from 90V to 60V. The terminal block, along with the selection tap, is placed on the left-hand side of the internal panel and marked by, "60Vac" and "90Vvac" Output. Follow these procedures to re-configure. (Factory configuration is 60Vac)



WARNING! - The unit must be turned off with AC power removed prior to output voltage selection.



CAUTION! -Do the selection carefully. Wrong selection may damage the loads.

2.6.3. Re-configuration from 60Vac to 90Vac

- 1) Make sure the power supply is turned off and the utility power is removed.
- 2) Loosen seizure screws on positions marked by "60Vac" and "90Vac".
- 3) Switch the tap wire from 60Vac position to 90Vac position.
- 4) Tighten seizure screws of both positions to specified torque.

2.6.4. Re-configuration from 90Vac to 60Vac

- 1) Make sure the power supply is turned off and the utility power is removed.
- 2) Loosen seizure screws on the positions marked by "60Vac" and "90Vac".
- 3) Switch the tap wire from 90Vac position to 60Vac position.
- 4) Tighten seizure screws of both positions to specified torque.

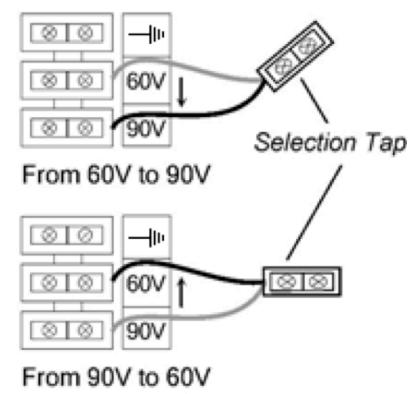


Figure 2.8,
Output Voltage
Reconfiguration

3. STARTUP & TEST

Once connections and configurations are made, start-up and test may begin.

- 1) Before you apply power, ensure that voltage and frequency of the utility matches nominal input specification of the power supply.
- 2) Please remove all the loads before running startup test.
- 3) **Connect** and switch “ON” the branch circuit protection device, (*user provided, located outside of the enclosure*), then switch the power supply’s circuit breaker, (*located on the internal panel*), to the “ON” position.
- 4) Use an RMS meter to measure output voltage of the unit. Regulation of output voltage is 5%. This means output voltage reading should be in the range of 95% to 105% of the selected output voltage.
- 5) Turn off the power supply circuit breaker and switch external service disconnect to the “OFF” position. Rewire the output voltage selection tap to select another output voltage and repeat steps 3 & 4.
- 6) If no output, please refer to **Trouble Shooting Guidelines**.

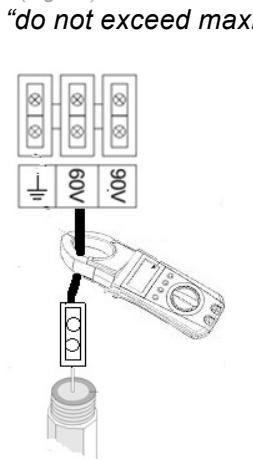
NOTE:

Output waveform of the power supply is quasi-square. So a true RMS meter is required for accurate measurement of the output voltage.

Current Measurement

With all loads attached, a convenient way to check the output current using a clamp meter.

(Fig 2.9)



“do not exceed maximum output current specifications”



WARNING!

The transformer inside the enclosure may be very HOT when the power supply is in operation, or has recently been turned off, “DO NOT touch it!”



4. Resetting The Thermal Fuse

- The transformer is equipped with a **Self Hold Thermal Sensor**. If the transformer is overheated, i.e. short circuit, over load, etc., the sensor will open and the power supply will turn off.
- To **Reset** : Flip the input Circuit breaker to the OFF position and leave it there. Allow at least 30-40min. for the unit to cool down. Once cooled, turn the breaker back to the ON position. If the unit still doesn't turn on, allow more time to cool by turning off the breaker. *Note: The breaker must be in the OFF position in order for the thermal sensor to cool and reset.*

5. TROUBLE SHOOTING GUIDELINES

The table shown below is designed to display typical symptoms, causes and solutions, beginning with the most obvious and working systematically through the unit. By following the solutions in this table, users can repair the units in the field. In the event that a component(s) in the unit needs to be replaced, please contact PDI for recommendations. Improper replacement may damage the unit, or the loads. If symptoms or problems that have arisen are not listed in (table 11.1), please contact Technical Support.

TROUBLE SHOOTING GUIDELINE TABLE

table 11.1

| Symptoms | Probable Causes | Solution |
|--|--|--|
| No output | Utility power failure | Verify utility power |
| | Poor output connections | Check connection at terminal block and tap wire for output connection and voltage selection. |
| | Short circuit | A short circuit will cause the thermal fuse to open. Remove power and repair the short (see "Resetting the thermal Fuse") |
| Unit Turns off, circuit breaker is on, utility power is present. | Thermal Fuse: Over Loaded or Over Heated | Turn off the power supply, remove excessive loads and turn the supply back on. (see "Resetting the thermal Fuse") Make sure power supply is in a well ventilated area. |



SB-UL6090-15PS UL Listed Power Supply | LIMITED 3-YEAR WARRANTY

PDI Communications Inc. (PDI) warrants that its UL Listed power supply is shipped free of manufacturing defects in production or material for a period of three years from the date your order leaves our plant.

Any liability of PDI under the warranty is strictly limited to either repairing or replacing the unit at the sole discretion of the company.

In the event of a failure, a return authorization number will be provided. PDI will require a clear understanding of the problem from the customer.

A request for a return authorization must be submitted to your factory representative. In the event that there is no factory representative in your area, call **Tim Vaas at 1-480-861-4861**.

A return authorization number will be provided. The return authorization number must be clearly marked on the outside of the shipping container.

The customer is responsible for freight charges to PDI and back to the original destination, unless other arrangements have been previously worked out, and at the sole discretion of PDI.

Freight collect and C.O.D. charges will not be accepted without prior approval from PDI.

Once received, a PDI technician will thoroughly test the unit to determine the cause of the problem or problems, and the unit will be repaired to factory standards under the warranty and returned to the sender.

If our engineering department determines that the damage was not caused by component failure, but was caused by improper installation, accident, neglect, misuse, or alteration of any kind, the three-year warranty on this unit will become void.

PDI will repair the unit for labor and component cost. Once it leaves our plant, the unit will have a one-year warranty with the same conditions as the original three-year warranty.

The customer will pay the freight back to its original destination.

The three-year warranty on this product supersedes all other warranties on this product expressed or otherwise.

PDI will not be liable for any consequential damages for breach of this warranty expressed or implied whatsoever.

Any action for a breach of this limited warranty must be made within three years from the date it leaves our plant.

PDI reserves the right to modify or discontinue this unit, change the design and/or function, without notice and without any obligation to modify previously purchased units.

